WHAT IS CLAIMED IS:

1. A laser irradiation apparatus comprising;

a first laser oscillator outputting a first laser beam having a wavelength not longer than that of visible light;

means for shaping the first laser beam into an elongated beam on a surface to be irradiated wherein the elongated beam has at least a first portion and a second portion, said first portion having a lower energy density than the second portion;

a second laser oscillator outputting a second laser beam of a fundamental wave;

means for irradiating the second laser beam to the first portion of the elongated beam having the lower energy density;

means for moving the surface to be irradiated in a first direction relatively to the first laser beam and the second laser beam; and

means for moving the surface to be irradiated in a second direction relatively to the first laser beam and the second laser beam.

2. A laser irradiation apparatus comprising;

a first laser oscillator outputting a first laser beam having a wavelength not longer than that of visible light;

means for shaping the first laser beam into an elongated beam on a surface to be irradiated wherein the elongated beam has at least a first portion and a second portion, said first portion having a lower energy density than the second portion;

a second laser oscillator outputting a second laser beam of a fundamental wavelength wherein the second laser beam has at least a first portion and a second portion having a higher energy density than the first portion;

means for irradiating the second portion of the second laser beam having the higher energy density to the first portion of the elongated beam having the lower energy density;

means for moving the surface to be irradiated in a first direction relatively to the first laser beam and the second laser beam; and

means for moving the surface to be irradiated in a second direction relatively to the first laser beam and the second laser beam.

3. A laser irradiation apparatus according to claim 1 or 2,

wherein each of the first laser oscillator and the second laser oscillator is selected from the group consisting of a continuous wave gas laser, a continuous wave

solid laser, and a continuous wave metal laser.

4. A laser irradiation apparatus according to claim 1 or 2,

wherein each of the first laser oscillator and the second laser oscillator is selected from the group consisting of an Ar laser, a Kr laser, a $CO_2$ laser, a YAG laser, a $YVO_4$ laser, a YLF laser, a $YAlO_3$ laser, an alexandrite laser, a Ti: Sapphire laser, and a helium-cadmium laser.

5. A laser irradiation apparatus according to claim 1 or 2,

wherein the first direction and the second direction are orthogonal to each other.

6. A laser irradiation apparatus according to claim 1 or 2,

wherein the surface to be irradiated is a film formed over a substrate transparent to the first laser beam having a thickness d, and

wherein an incidence angle $\phi$ of the first laser beam to the surface to be irradiated satisfies an inequality $\phi \geqq \arctan (W/2d)$, when a major axis of the elongated beam or a minor axis of the elongated beam is assumed to have a length of W.

7. A laser irradiation method comprising the steps of;

shaping a first laser beam having a wavelength not longer than that of visible light into an elongated beam on a surface to be irradiated; and

irradiating the surface with the elongated beam wherein an irradiation area of the elongated beam has at least a first portion and a second portion, said first portion having a lower energy density than the second portion;

irradiating the surface with a second laser beam concurrently with the elongated beam in such a manner that an irradiation area of the second laser beam overlaps at least the first portion of the irradiation area of the elongated beam while moving the surface relatively to the elongated beam and the second laser beam in a first direction.

8. A laser irradiation method comprising the steps of;

shaping a first laser beam having a wavelength not longer than that of visible light into an elongated beam on a surface to be irradiated;

irradiating the surface with the elongated beam wherein an irradiation area of the elongated beam on the surface has at least a first portion and a second portion, said

first portion having a lower energy density than said second portion;

irradiating the surface with a second laser beam concurrently with the elongated beam wherein an irradiation area of the second laser beam on the surface has at least a first portion and a second portion having a higher energy density than the first portion, said second laser beam having a fundamental wave,

wherein the irradiation of the elongated beam and the second laser beam is performed in such a manner that the second portion of the irradiation area of the second laser beam overlaps at least the first portion of the irradiation area of the elongated beam while moving the surface relatively to the elongated beam and the second laser beam in a first direction.

9. A laser irradiation method according to claim 7 or 8,

wherein each of the first laser beam and the second laser beam is emitted from a laser selected from the group consisting of a continuous wave gas laser, a continuous wave solid laser, and a continuous wave metal laser.

10. A laser irradiation method according to claim 7 or 8,

wherein each of the first laser beam and the second laser beam is emitted from an Ar laser, a Kr laser, a $CO_2$ laser, a YAG laser, a $YVO_4$ laser, a YLF laser, a $YAlO_3$ laser, an alexandrite laser, a Ti: Sapphire laser, and a helium-cadmium laser.

11. A laser irradiation method according to claim 7 or 8,

wherein the surface to be irradiated is a film formed over a substrate transparent to the first laser beam having a thickness d, and

wherein an incidence angle $\phi$ of the first laser beam to the surface to be irradiated satisfies an inequality $\phi \geqq \arctan(W/2d)$, when a major axis of the elongated beam or a minor axis of the elongated beam is assumed to have a length of W.

12. A method of manufacturing a semiconductor device comprising the steps of;

forming a non-single crystalline semiconductor film over a substrate;

shaping a first laser beam emitted from a first laser oscillator into an elongated beam on a surface to be irradiated wherein the first laser beam has a wavelength not longer than that of visible light;

irradiating the non-single crystalline semiconductor film with the elongated beam wherein an irradiation area of the elongated beam has at least a first portion and a

second portion, said first portion having a lower energy density than the second portion;

irradiating the non-single crystalline semiconductor film with a second laser beam emitted from a second laser oscillator, said second laser beam having a fundamental wave wherein the irradiation of the second laser beam is performed concurrently with the irradiation of the elongated beam in such a manner that an irradiation area of the second laser beam overlaps at least the first portion of the irradiation area of the elongated beam; and

moving the substrate relatively to the elongated beam and the second laser beam in a first direction, thereby, forming a crystal grain region in the non-single crystalline semiconductor film; and

moving the substrate in a second direction relatively to the elongated beam and the second laser beam.

13. A method of manufacturing a semiconductor device comprising the steps of;

forming a non-single crystalline semiconductor film over a substrate,

shaping a first laser beam emitted from a first laser oscillator into an elongated beam on a surface to be irradiated wherein the first laser beam has a wavelength not longer than that of visible light;

irradiating the non-single crystalline semiconductor film with the elongated beam wherein an irradiation area of the elongated beam has at least a first portion and a second portion, said first portion having a lower energy density than the second portion;

irradiating the non-single crystalline semiconductor film with a second laser beam emitted from a second laser oscillator outputting a fundamental wave wherein an irradiation area of the second laser beam has at least a first portion and a second portion, said second portion having a higher energy density than the first portion;

forming a crystal grain region while moving the substrate in a first direction relatively to the elongated beam and the second laser beam;

moving the substrate in a second direction relatively to the elongated beam and the second laser beam,

wherein the irradiation of the elongated beam and the second laser beam is performed in such a manner that the second portion of the irradiation area of the second laser beam overlaps at least the first portion of the irradiation area of the elongated laser beam.

14. A method of manufacturing a semiconductor device according to claim 12

or 13,

wherein each of the first laser oscillator and the second laser oscillator is selected from the group consisting of a continuous wave gas laser, a continuous wave solid laser, and a continuous wave metal laser.

15. A method of manufacturing a semiconductor device according to claim 12 or 13,

wherein each of the first laser oscillator and the second laser oscillator is selected from the group consisting of an Ar laser, a Kr laser, a $CO_2$ laser, a YAG laser, a $YVO_4$ laser, a YLF laser, a $YAlO_3$ laser, an alexandrite laser, a Ti: Sapphire laser, and a helium-cadmium laser.

16. A method of manufacturing a semiconductor device according to claim 12 or 13,

wherein the first direction and the second direction are orthogonal to each other.

17. A method of manufacturing a semiconductor device according to claim 12 or 13,

wherein the substrate is transparent to the first laser beam and has a thickness d, and

wherein an incidence angle $\phi$ of the first laser beam to the surface to be irradiated satisfies an inequality $\phi \geqq \arctan(W/2d)$, when a major axis of the elongated beam or a minor axis of the elongated beam is assumed to have a length of W.